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CLAIMS

What is claimed is:

- 1 1. A source having an impedance and connected to a load, the source
2 comprising:
3 a detection circuit to determine whether a current flow through the impedance is
4 load-induced or source-induced; and
5 a processing circuit to perform an operation based upon whether the current
6 flow is load-induced or source-induced.

- 1 2. The source as claimed in claim 1, wherein the detection circuit
2 determines polarities of the current flow and an output voltage across the load, and
3 determines the current flow to be source-induced or load-induced based upon the
4 polarities of the current flow and the output voltage.

- 1 3. The source as claimed in claim 1, wherein the detection circuit
2 determines polarities of the current flow and an output voltage across the impedance,
3 and determines the current flow to be source-induced if the polarities are the same and
4 load-induced if the polarities are opposite to each other.

- 1 4. The source as claimed in claim 1, further comprising:
2 a voltage source to generate an output voltage;
3 a DC offset elimination circuit, which is a DC servo control loop connected to
4 the voltage source, to eliminate DC offset voltages of the output voltage; and
5 an output impedance circuit, which is a feedback loop connected to the voltage
6 source, to generate an output impedance for the source and which operates
7 simultaneously with the DC offset elimination circuits;

1 wherein the detection circuit is connected between the DC offset elimination
2 circuit and the output impedance circuit, determines whether the current flow is load-
3 induced or source induced, and the processing circuit eliminates the current flow which
4 is source-induced.

1 5. The source as claimed in claim 1, wherein the source is an active
2 harmonic filter that selectively opposes currents generated by local harmonic sources
3 while not generating signals to oppose currents caused by harmonic voltage sources
4 located elsewhere in a system.

1 6. The source as claimed in claim 1, wherein the source, the DC offset
2 elimination circuit, and the output impedance circuits are not included and the
3 remainder of the system is a measuring instrument further comprising an output
4 indicator which indicates whether the current flow is source-induced or load-induced.

1 7. A power source circuit comprising:
2 a voltage source to generate an output voltage;
3 a DC offset elimination circuit, which is a DC servo control loop connected to
4 the voltage source, to eliminate DC offset voltages of the output voltage; and
5 an output impedance circuit, which is a feedback loop connected to the voltage
6 source, to generate an output impedance for the source and which operates
7 simultaneously with the DC offset elimination circuits; and
8 a detection circuit, connected between the DC offset elimination circuit and the
9 output impedance circuit, which determines whether a current flow through the output
10 impedance is load- induced or source induced, and eliminates the current flow which is
11 source-induced.

8. The power source circuit as claimed in claim 7, wherein the detection
circuit comprises a resistor connected between the DC offset elimination circuit and the
output impedance circuit, and the output impedance has a resistive component.

1 9. The power source circuit as claimed in claim 7, wherein the detection
2 circuit comprises a capacitor connected between the DC offset elimination circuit and
3 the output impedance circuit, and the output impedance has an inductive component.

1 10. The power source circuit as claimed in claim 7, wherein the detection
2 circuit comprises:

3 a resistor; and

4 a capacitor;

5 wherein the output impedance has resistive and inductive components.

1 11. The power source circuit as claimed in claim 7, further comprising:
2 a gain varying circuit which adjusts magnitudes of resistive and inductive
3 components of the output impedance circuit.

1 12. The power source circuit as claimed in claim 11, wherein the gain
2 varying circuit comprises:

3 a first multiplying D/A which varies a gain for the resistive component of the
4 output impedance circuit; and

5 a second multiplying D/A which adjusts a gain of the inductive component of
6 the output impedance circuit.

1 13. The power source circuit as claimed in claim 7, wherein:
2 the voltage source comprises:
3 an inverting amplifier which inverts and amplifies an input voltage,
4 a differential gain block to provide a voltage proportional to the output
5 voltage of the source which proportional voltage is used as a negative feedback signal to
6 control the source output voltage,
7 a current sensing element to sense a current output from the inverting
8 amplifier, and

1 a differential gain block to provide a voltage proportional
2 to the current passing through the current sensing element;

3 wherein the detection circuit is connected to an output end of the current sensing
4 differential gain block.

1 14. The power source circuit as claimed in claim 13, wherein:
2 the DC offset circuit comprises:

3 a differential integrator from which a correcting signal to eliminate
4 undesired DC and low frequency AC signals is fed back to the summing junction of the
5 inverting amplifier;

6 wherein the detection circuit is connected to the differential integrator.

1 15. The power source circuit as claimed in claim 14, further comprising a
2 resistor connected between the differential integrator and the summing junction of the
3 inverting amplifier.

1 16. The power source circuit as claimed in claim 13, wherein the output
2 impedance circuit comprises:

3 at least one resistive element and one inductive element (capacitor), in parallel,
4 and connected at a first end to the summing junction of the inverting amplifier and at a
5 second end to the detection circuit and the voltage output of the current sensing
6 differential gain block.

1 17. The power source circuit as claimed in claim 14, wherein the output
2 impedance circuit comprises:

3 a first resistive element and a first inductive element (capacitor), in parallel, and
4 connected at a first end to the summing junction of the inverting amplifier and at a
5 second end to the detection circuit and the voltage output of the current sensing
6 differential gain block.

1 18. The power source circuit as claimed in claim 17, wherein the detection
2 circuit comprises:

3 a second resistive element and a second inductive element (capacitor), in
4 parallel, wherein first ends of the second resistive and inductive elements (capacitor)
5 are each connected to the differential integrator and second ends of the second resistive
6 and inductive elements (capacitor) are respectively connected to the first resistive and
7 inductive elements (capacitor) of the output impedance circuit.

1 19. A method of controlling operations of a source which is connected to a
2 load, the method comprising:

3 determining whether a current flow through an impedance of the source is
4 load-induced or source-induced; and

5 controlling one of the operations based upon the whether the current flow is
6 load-induced or source-induced.

1 20. The method as claimed in claim 19, wherein the determining comprises:
2 determining polarities of the current flow and an output voltage across the
3 impedance; and

4 determining the current flow to be source-induced or load-induced based upon
5 the polarities of the current flow and the output voltage.

1 21. The method as claimed in claim 20, wherein the determining comprises:
2 determining polarities of the current flow and an output voltage across the
3 impedance; and

4 determining the current flow to be source-induced if the polarities are the same
5 and load-induced if the polarities are opposite to each other.

1 22. A method of controlling a power source circuit, the method comprising:
2 generating an output voltage;
3 forming a first loop which eliminates DC offset voltages of the output voltage;

1 forming a second loop to generate an output impedance for the power source
2 circuit simultaneously with the eliminating of the DC offset voltages; and
3 determining whether a current flow through the output impedance is load-
4 induced or source induced, and eliminating the current flow which is source-induced.

1 23. The method as claimed in claim 22, wherein the determining of whether
2 the current flow through the output impedance is load-induced or source-induced
3 comprises:

4 determining polarities of the current flow and an output voltage across the
5 impedance; and

6 determining the current flow to be source-induced if the polarities are the same
7 and load-induced if the polarities are opposite to each other.